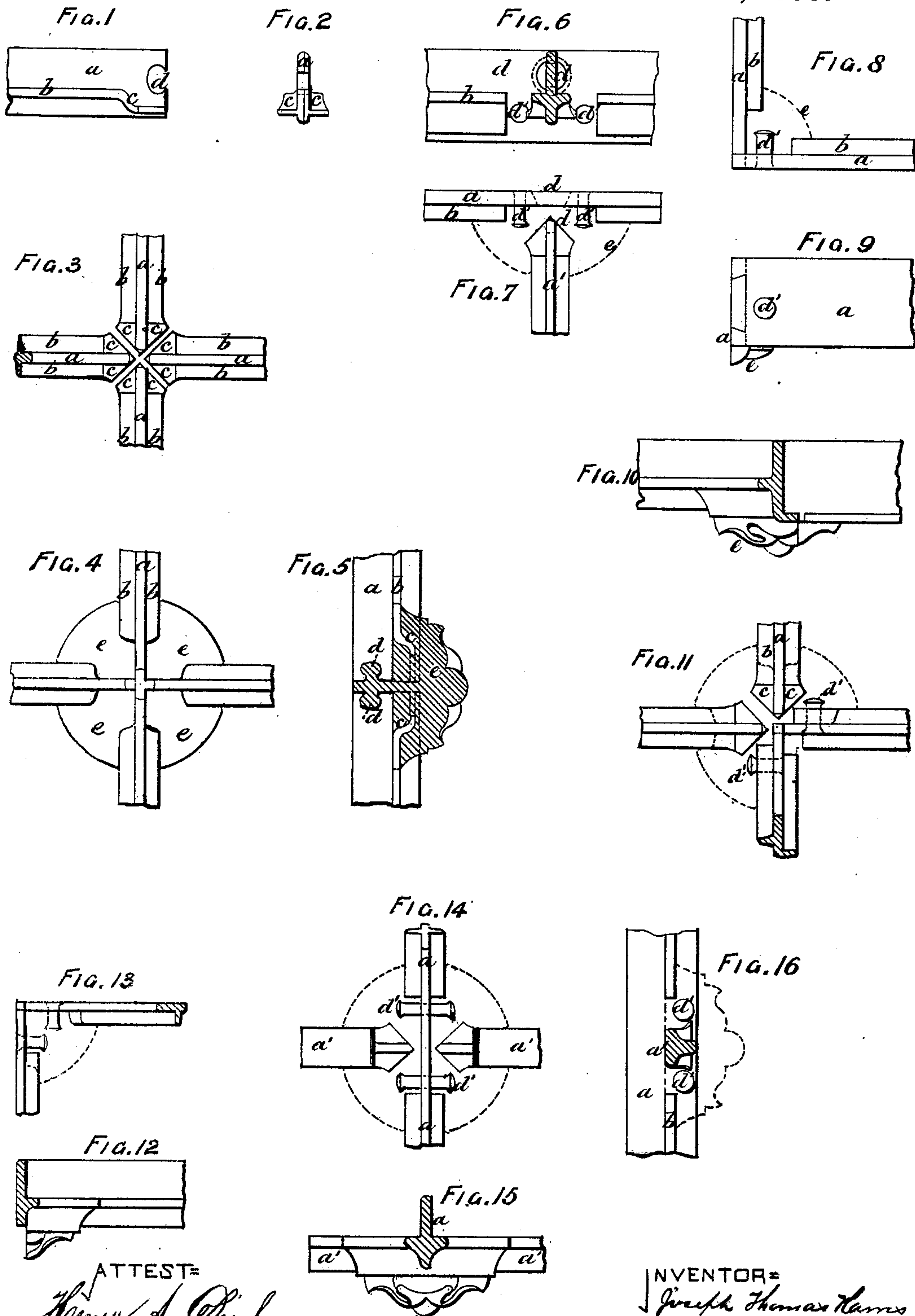


J. T. HARRIS.  
Metallic Window Sash.

No. 197,124.

Patented Nov. 13, 1877.



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(Arthur C. Fraser)

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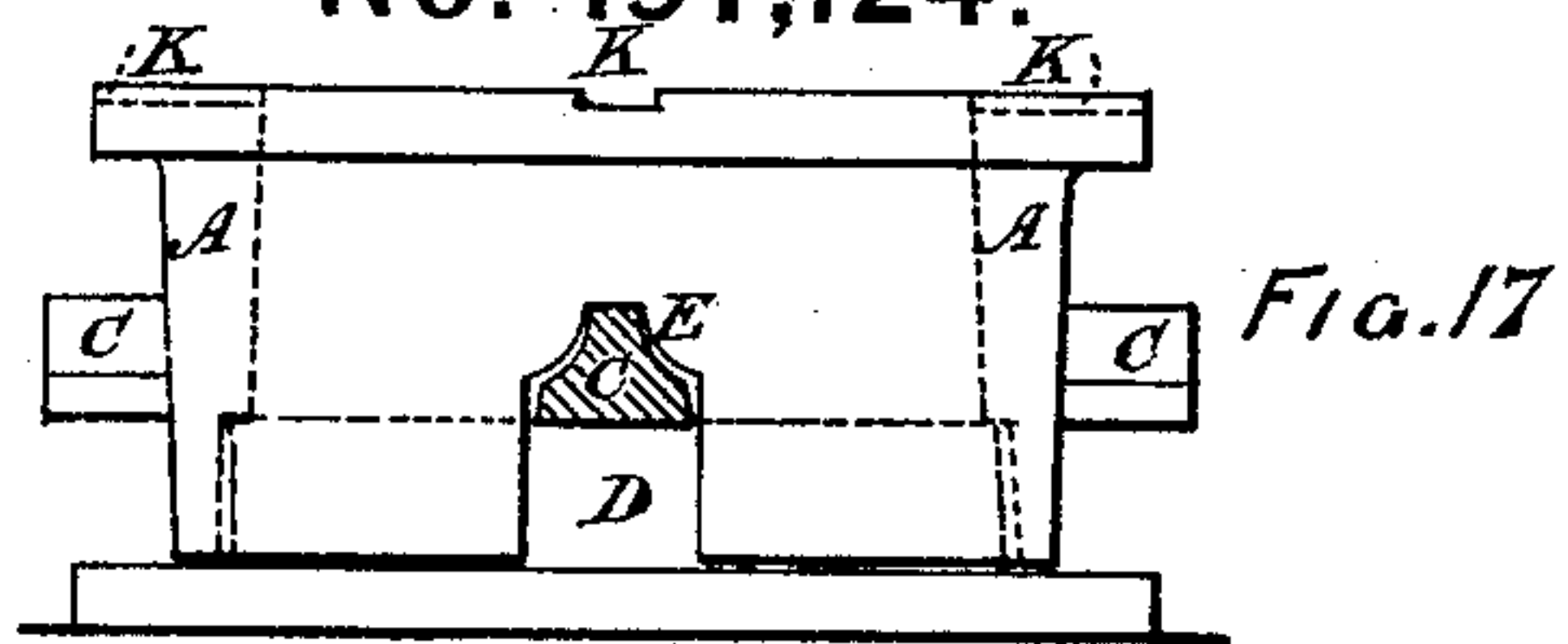


Fig. 17

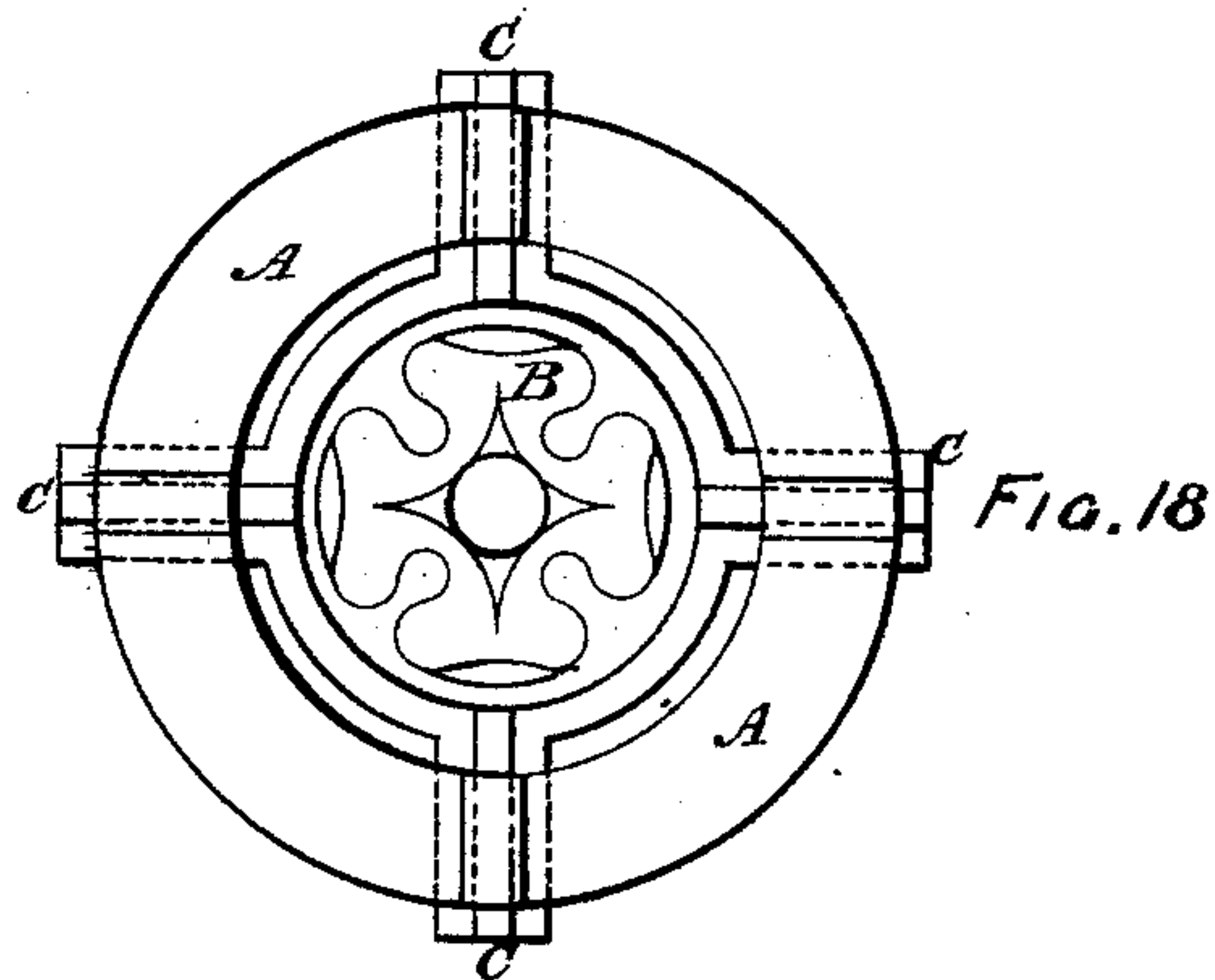


Fig. 18

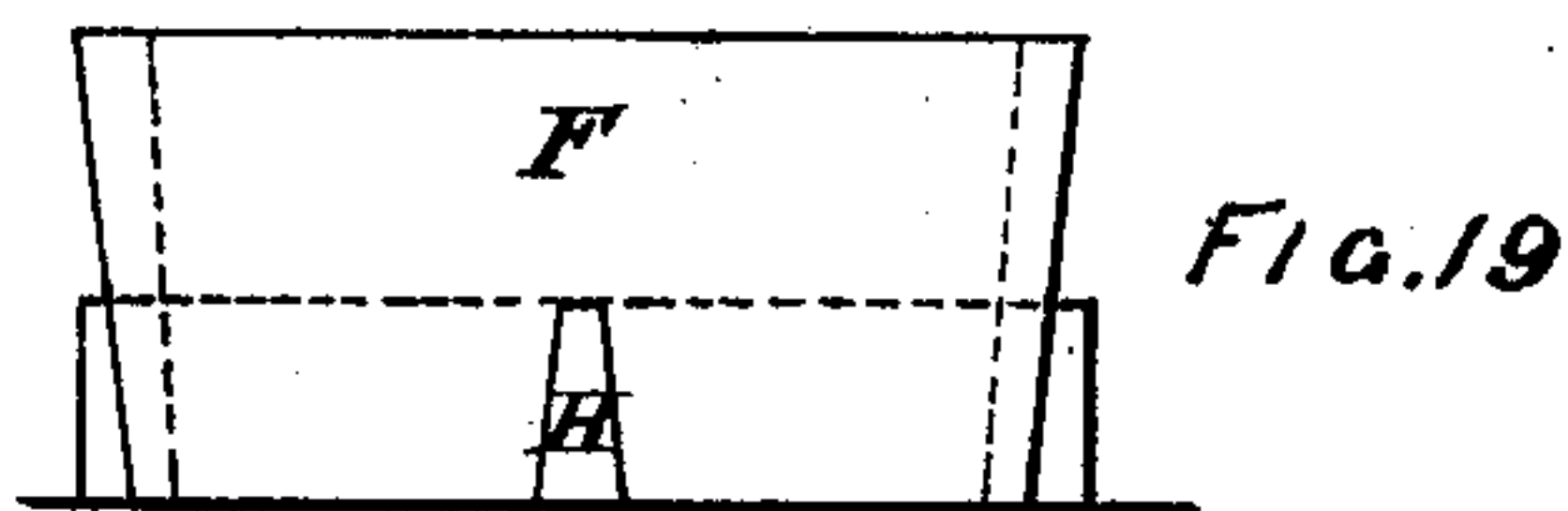


Fig. 19

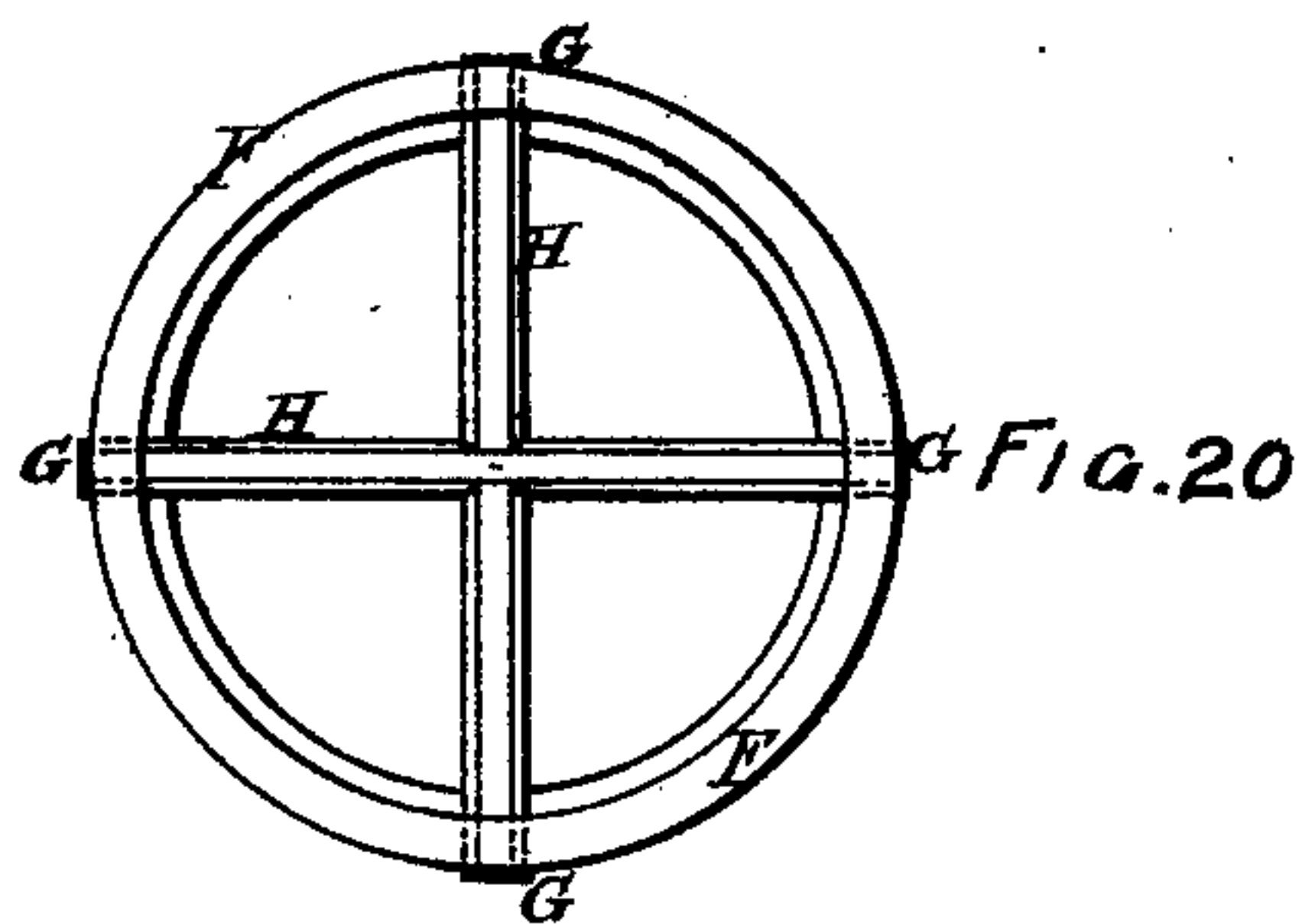


Fig. 20

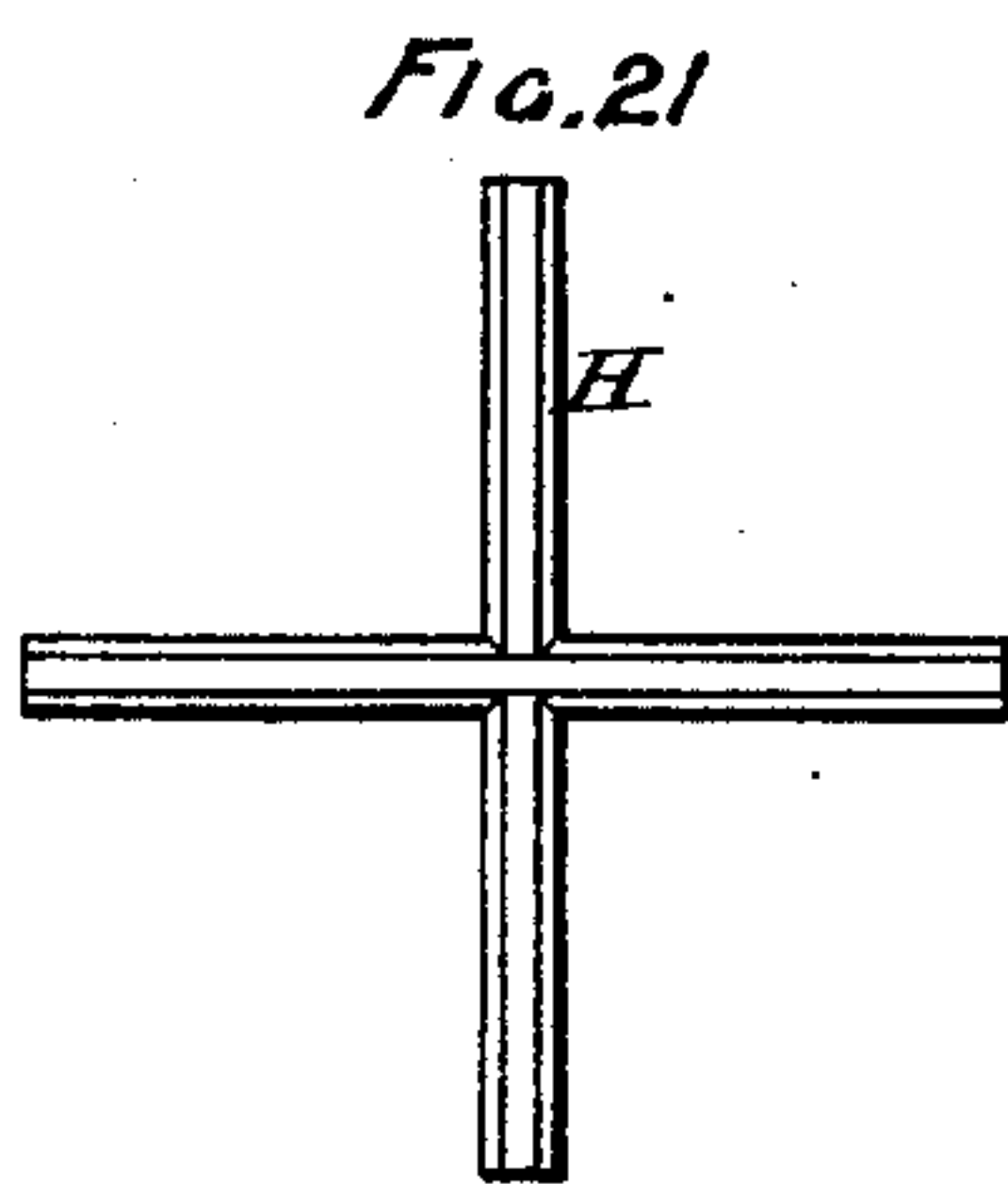


Fig. 21

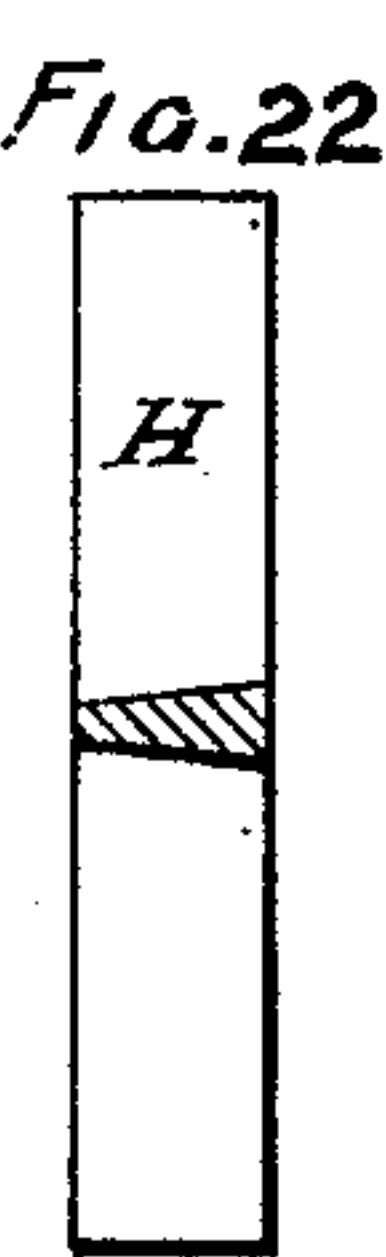


Fig. 22

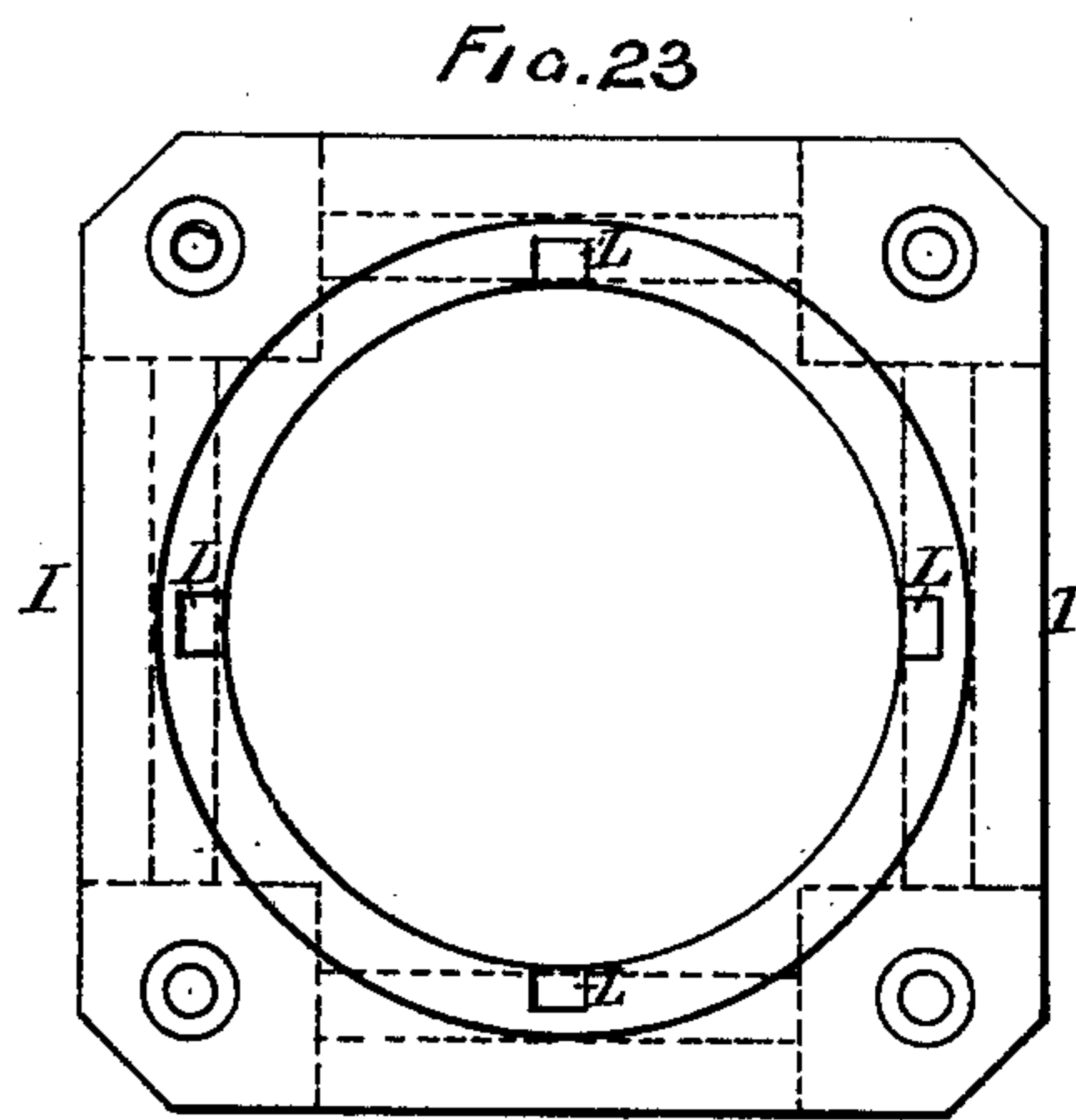


Fig. 23

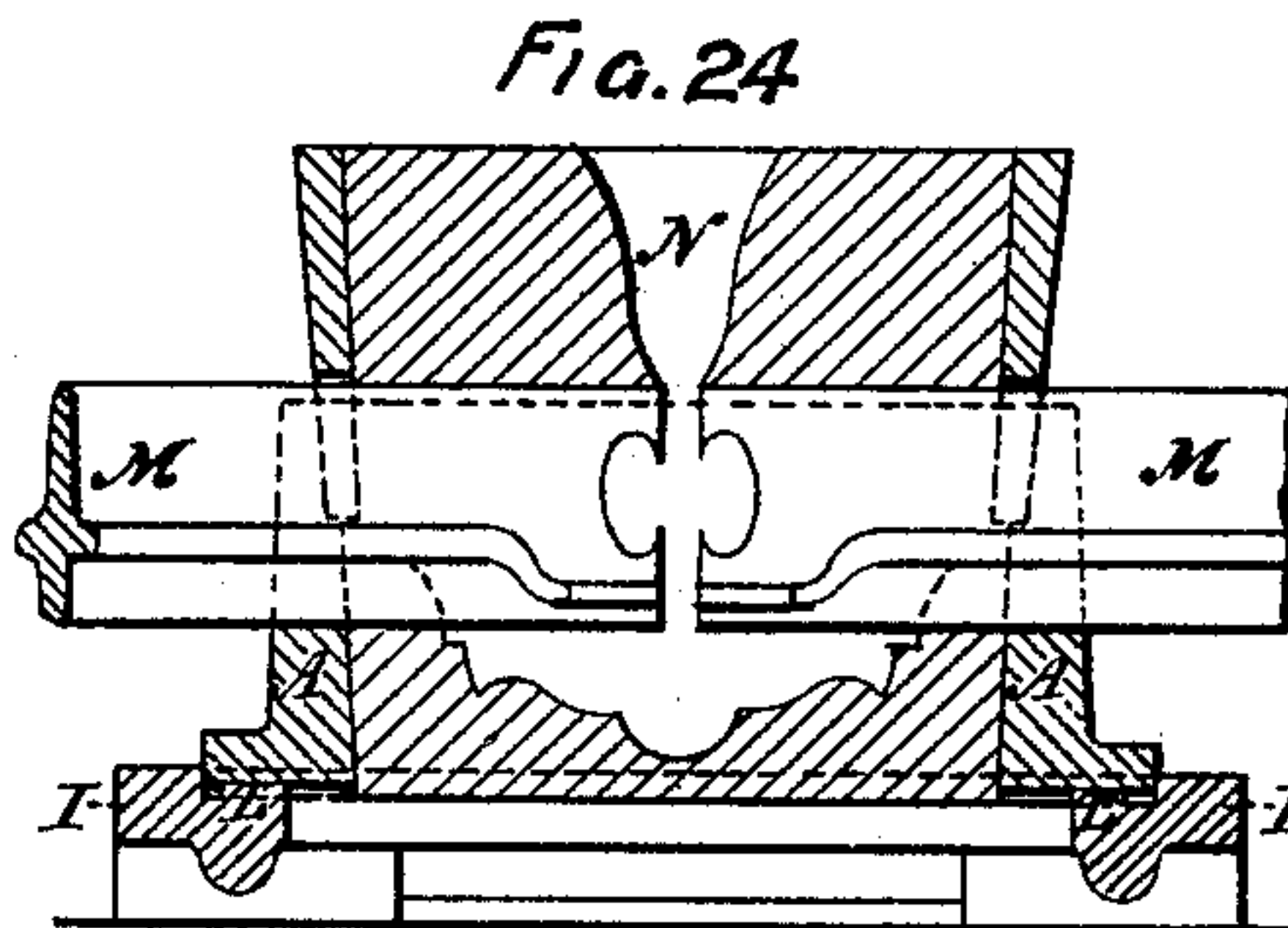


Fig. 24

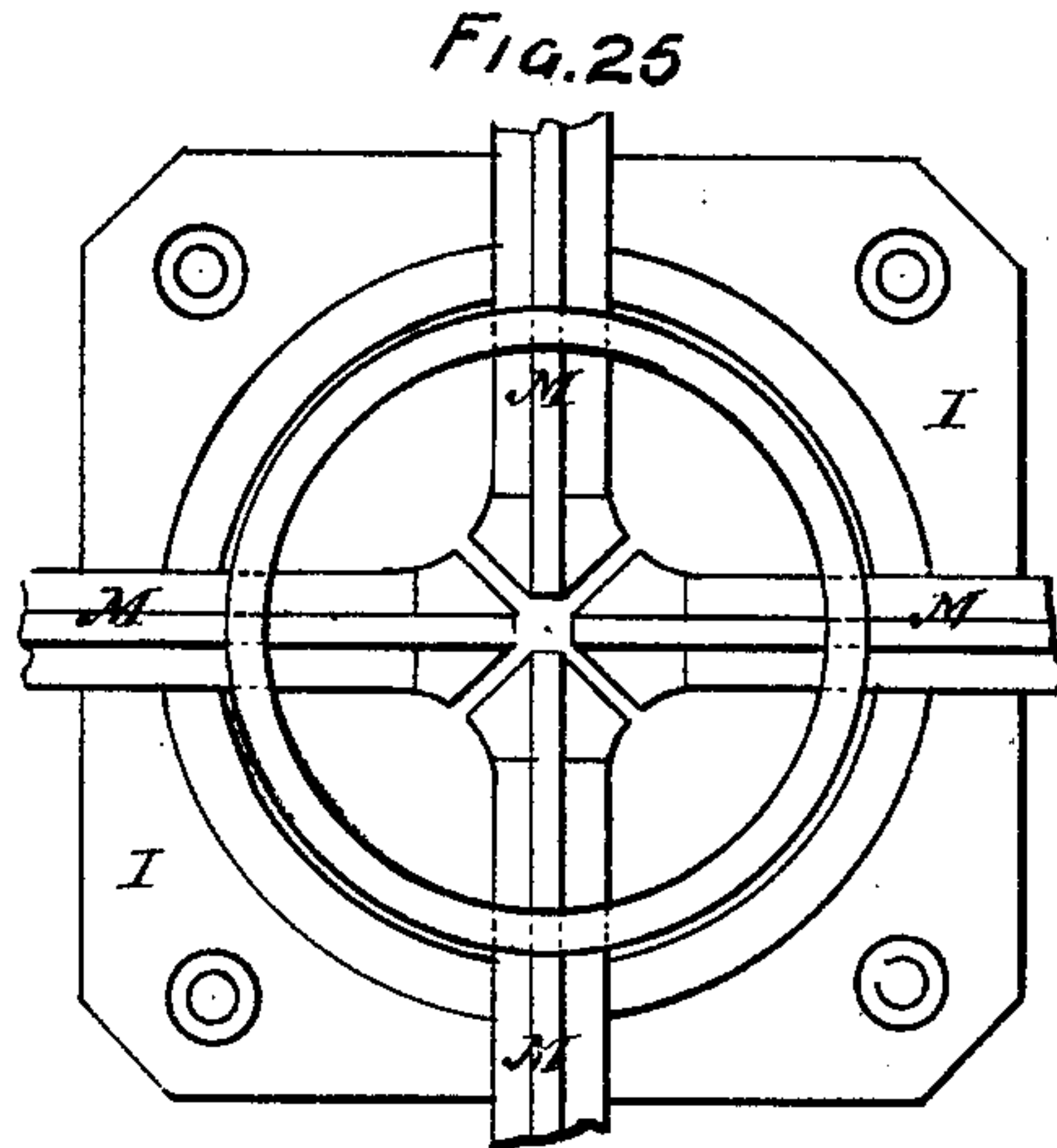


Fig. 25

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# UNITED STATES PATENT OFFICE.

JOSEPH THOMAS HARRIS, OF BRISTOL, ENGLAND.

## IMPROVEMENT IN METALLIC WINDOW-SASHES.

Specification forming part of Letters Patent No. **197,124**, dated November 13, 1877; application filed August 31, 1877.

*To all whom it may concern:*

Be it known that I, JOSEPH THOMAS HARRIS, of Bristol, England, engineer, have invented or discovered certain new and useful Improvements in the Manufacture of Metallic Window-Frames and Skylights; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters and figures marked thereon—that is to say:

My invention has reference to the manufacture of metallic frames of windows and skylights from a number of detached pieces of bar laid together in the required form, and then united by casting a boss and dovetail onto the bars at each of the junctions. Some such mode of manufacture is partly described in the specification of David Moline's English Patent, dated 30th January, 1855, No. 227, but has hitherto possessed several objections, which it is the object of the present invention to overcome.

These objections are as follows: First, the sheets or panes of glass have to be cut to suit the shape of the boss at the junction, the boss being run onto or around the fillet of the sash-bar inside the rabbet, and the cost and trouble of glazing are thus increased; second, there is an unsightly appearance presented on the inside of the boss, and it can only be made of very large size; thirdly, as it is impossible to allow the glass to pass or overlap at the junctions of the different sash-bars and cross-pieces, the mode of manufacture is not adapted for roof or other circular, angular, or slanting lights.

Now, my invention consists in forming the sash or other bars of which the frame of the window or skylight has to be made with projecting portions at a lower level than the rabbet of the bars, and a dovetail in the fillet or tongue, such projecting portions being situated at every place where a junction has to be made, as shown in the annexed drawings. These projecting portions may conveniently be made by giving a bend, turn, or dovetail to the thicker or rabbet portion of the said bars, or by inserting studs or pins into the bars; and the dovetail holes may be made by punching or otherwise forming a hole in the fillet

or tongue. The bars being made in a mold of any desired design in front, but without any part to form an objectionable and unsightly back to the boss, the metal for forming the junction is run into the mold, and rises to and embraces or surrounds the bend, turn, dovetail, or projection before named up to the rabbet only of the bar, except in the central or meeting-points and dovetail of the fillets, where sufficient metal rises to perfect the meeting of the fillets, leaving a continuous bearing-surface or rabbet for the glass into a clean angle or point.

My invention will be fully understood by the accompanying drawings.

Figure 1 is a side view, and Fig. 2 an end view, of a piece of sash-bar, *a*, the rabbet or thicker portion *b* of which is formed with a bend, turn, or dovetail, *c*, and there is also a dovetail hole, *d*, as above explained. Fig. 3 shows four of these sash-bars placed in the same relative position as they would occupy in a mold when they have to be joined together. Fig. 4 shows the same in external view, and Fig. 5 in section after the boss *e* has been formed around their ends, so as to effect the junction.

It will be seen that the cast metal has risen above the bends *c c* up to the rabbet of the bar, and no farther, except into the dovetail holes *d*, and at the meeting-points, where the space or interval between the ends of the bars of, say, one-third of an inch, more or less, is filled up with the metal, so as to perfect the junction.

Figs. 6 and 7 represent the mode of making a half-boss, such as is required at the side or top of the window-frame. The side or top sash-bar *a* may either have a bend given to its rabbet *b*, as before described, or (as I prefer) a portion of the rabbet may be cut away, as shown, and one or more studs, *d'*, be inserted below the line of the fillet and dovetail holes or recesses formed at *d d*. The end of the bar *a'*, to be joined thereto, being placed in position in the mold with the bar *a*, the cast metal is run in so as to form a half-boss, which extends only up to the top line of the fillet *b*. In making a quarter-boss, such as is required for the corner of a frame, (see Figs. 8 and 9,) I prefer to fit the two bars together by a dove-



tail or similar joint, as shown, then to place them in a suitable mold and run in the cast metal, so as to surround the studs  $d'$  up to the line of the rabbets  $b$ .

Where a portion of the window-frame is required to be capable of opening, I make the main portion of the frame, as seen in Figs. 10 and 11, and the opening portion, as seen in Figs. 12 and 13, so as to correspond with, and fit into the main portion having dovetail holes.

Frames for skylights and for lights for the roofs of cellars or floor-gratings are made in the same manner as the frames for windows, except that in the transverse bars or cross-pieces  $a' a'$ , (see Figs. 14, 15, and 16,) the portion above the molded or rabbet part  $b$  does not exist, so that the glass may pass or overlap at the junctions without obstruction. The longitudinal bars  $a a$  are each made in one or any number of pieces, with the rabbets partly cut away at the junctions and studs inserted, or with the rabbets bent or turned down, and with dovetail holes, as before described. And in window-frames, also, it will generally be found best to make each of the longitudinal bars and the top and bottom bars in one piece, the transverse or cross pieces being fitted in between them, and the junctions made as above explained.

Without limiting myself to any particular way of making the mold and casting the metal, I will describe what I have found to answer best in practice. A, Figs. 17 and 18, is a lower chill, which I place, as shown, over a pattern consisting of a boss portion, B, of the design desired, in the boss of the window-frame, and of four arms, C C, corresponding with the sash-bars. The pattern rests on a bed, D, over which the chill fits, and the chill is formed with openings E, to fit over the arms C C. The sand for forming the mold is then rammed in from above, so as to fill the chill. F, Figs. 19 and 20, is an upper chill, having gaps G G to receive a movable piece, H. (Shown separately in Figs. 21 and 22.) This chill, with the piece H therein, is likewise filled with sand. Upon a suitable frame or floor I attach, at positions corresponding with the bosses in the window-frame to be made, a number of frames, such as

that shown at I, in plan, in Fig. 23, and in vertical section in Fig. 24. I remove the lower chill A, Figs. 17 and 18, from the pattern, and, having reversed it, place it, with the sand-mold therein, upon one of the frames I, (see Fig. 24,) the recesses K K fitting upon the studs L L, so that the chill may be in its right position. The four sash-bars M M to be united are then laid in position, (see Figs. 24 and 25,) the said bars fitting in the recesses left in the sand-mold by the arms C. I then take the upper chill F, Figs. 19 and 20, and having removed the piece H, and made a runner or gate, N, in the center, (see Fig. 24,) I place this chill over the chill C, as shown in Fig. 24, the gaps left by the piece H fitting over the bars M. The liquid metal is then run in by the runner or gate N, and, filling all parts of the mold not occupied by the bars M M, unites these bars and at the same time forms the boss. The method above described is adopted at all the various forms of junction, whether for half, quarter, or three-quarter bosses, angles, or otherwise, and where any number of bars meet.

What I claim, and desire to secure by Letters Patent, is—

1. The manufacture of metallic frames for windows and skylights, by forming the sash or other bars with a part or parts,  $c$  or  $d'$ , below the line of the rabbet or molding  $b$ , to receive and be held by the cast-metal boss  $e$ , which boss extends only up to the said rabbet or molding, substantially as and for the purpose herein set forth and shown.

2. In combination with the part or parts  $c$  or  $d'$  below the line of the rabbet or molding  $b$ , the dovetail holes  $d d$ , substantially as and for the purpose herein set forth and shown.

In witness whereof I, the said JOSEPH THOMAS HARRIS, have hereunto set my hand this 28th day of July, one thousand eight hundred and seventy-seven.

JOS. T. HARRIS.

Witnesses:

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